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Seasonal abundance and varietal reaction of coconut perianth mite, *Aceria guerreronis* Keifer in Dharwad area

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Abstract: Studies on seasonal abundance and varietal reaction of eriophyid mite was carried out during 2004-2005 in Dharwad area. Results on seasonal abundance indicated that the mite population occurred through out the year with variation during different seasons of the year. The mite population was high during April and May 2005. It started declining with the onset of rain during first fortnight of July 2005. By February 2005, the population started increasing when atmospheric temperature also started increasing. Damaged nuts were in the category of grade 3 and most of the coconut palms possessed more than 54 per cent damaged nuts. Results on varietal reaction of eriophyid mite indicated that Gangabondam recorded least number of mite population (28.96) and also recorded least damage grade, lowest percentage of damaged nuts with highest percentage of healthy nuts.

Key Words: Coconut, *Aceria guerreronis* varities, seasonal incidence

Introduction

The coconut perianth mite, *Aceria guerreronis* Keifer was first reported in 1965 from the Guerrero state of Mexico (Keifer, 1965). In India, the mite was reported from many coconut gardens of Kerala during 1997-98 and in Karnataka and Tamil Nadu during 1998-99. Feeding injury by large number of mites results in the brownish patches. Damage to young nuts by the mites results in poor development of the nut, reduction in kernel content and poor quality husk. As the nut grows, this injury on the nuts leads to warting and longitudinal fissures on the nut surface. Although the pest was present in the gardens throughout the year, the infestation was more severe in relatively dry climates or during the dry periods of wetter climates (Zuluaga and Sanchez, 1971). Andaman Ordinary (11.43%) and Gangabondam (12.67%) recorded minimum percentage of nuts damaged by the coconut mite (Muthaih and Bhaskaran, 1999). The information on surveillance helps to take up the control measures at appropriate time in minimizing the incidence. However, the information on the varietal interaction with the coconut perianth mite is scarce under south Indian conditions. Hence, the present investigations were carried out.

Material and methods

Surveillance on coconut perianth mite, *Aceria guerreronis* Keifer was carried out around Dharwad in five gardens possessing the palms in the age range of 15-20 years at 15 days intervals from August 2004 to July 2005. Three nuts of four month old were plucked from five trees in each garden. Nuts were brought to the laboratory for recording the active stages of mite. The perianths were removed and observations were made on three spots on surface of the nut covered by the perianth and three spots on inner surface of the three inner most perianths in an area of 28.28 mm2 under stereo binocular microscope. In each garden, five fully matured bunches from randomly selected five trees were observed to record the damage of the nut surface due to mite infestation and worked out the percentage of damaged nuts. The damage of the nut surface was assessed based on the gradings of zero to 4 as described by Julia and Mariau (1979).

Studies on screening of coconut varieties against the eriophyid mite were carried out at new orchard, department of Horticulture, UAS, Dharwad. In each variety three nuts were selected randomly and mite population was recorded under microscope i.e., number of mites from 3 spots on the nut surface and 3 spots on inner surface of inner perianth. Observations were recorded during months of March, April, May and June along with damage grade when the mite incidence was high. Ten varieties of coconut screened against the mites were West Coast Tall, Arasikere Tall, Laccadive, Gangabondam, Philippines, Green Dwarf, Andaman Dwarf, Laccadive Dwarf, Green Tall and Spicata.

Results and Discussion

The surveillance of *A. guerreronis* in coconut ecosystem recorded from August 2004 to July 2005 revealed that the mite population on the nut surface ranged from 39.70 to 101.76 mites per 28.28 mm^2 (Table 1). The population of mite was relatively less during the period from first fortnight of August (51.30) to first fortnight of October (49.13). This might be due to showers received during that period. The mite population was relatively more from second fortnight of October (55.25) to second fortnight of December (73.63), which might be due to dry spell during that periods. From first fortnight of March onwards, the mite population was more upto May second fortnight. The reason for increase in mite population may be due to favorable dry and warm climate.

The mite population was relatively more on nut surface than on perianth due to more succulence of the nut surface. Zuluaga and Sanchez (1971) observed the presence of mites throughout the year, with severe infestation during relatively dry climates or during the dry periods of wetter climate. Variation in the incidence of mite population might be due to differences in the rainfall which is in accordance with the report of Haq (1999), the mite population reached peak during summer months in the present study which is in line with the observations of Yaligar (2004).

The egg population recorded on the nut surface ranged from 25.13 to 82.50 mites per 28.28 mm2 area. The peak occurrence

Table 1. Incidence of Aceria guerreronis in coconut ecosystem from August 2004 to July 2005 around Dharwad

Month/ fortnight	Mean number of mites/28.28 mm²on		Mean number of eggs/28.28 mm² on		Damaged nuts (%)	Damage grade
	Nut surface	Perianth	Nut surface	Perianth		
August – I	51.30	26.58	40.13	15.16	74.60	2.85
August – II	39.70	15.03	30.57	9.66	54.62	2.30
September – I	47.15	39.09	63.02	13.13	67.81	3.20
September – II	51.03	50.53	70.13	23.23	68.42	3.24
October – I	49.13	37.23	58.73	14.29	70.27	2.96
October – II	55.25	39.30	25.13	15.23	84.84	3.73
November – I	66.79	38.71	55.30	40.13	76.32	3.10
November – II	68.13	44.13	55.79	25.33	77.24	3.06
December – I	69.75	15.75	75.23	13.33	78.67	3.20
December – II	73.63	37.37	59.35	19.73	77.35	3.49
January – I	65.53	36.37	65.37	13.23	68.18	3.09
January – II	67.66	40.91	51.27	17.29	70.74	2.99
February – I	71.19	39.80	69.32	23.30	75.12	3.20
February – II	70.90	29.18	70.00	15.37	82.06	3.54
March – I	78.66	40.66	70.26	25.12	81.21	3.42
March – II	85.99	37.08	75.83	19.26	85.66	3.80
April – I	87.66	45.76	76.66	20.33	79.66	3.10
April – II	90.26	46.88	79.53	21.73	82.53	3.25
May – I	99.66	47.53	79.93	23.56	79.56	2.80
May – II	101.76	51.50	82.50	25.00	83.66	3.35
June – I	73.33	33.15	57.66	14.33	65.50	2.10
June – II	67.15	34.25	53.10	16.20	69.30	3.00
July – I	49.33	29.10	45.20	12.30	72.50	2.95
July – II	48.21	30.50	42.66	15.66	71.33	3.10
Average	67.88	36.93	60.53	18.41	74.88	3.12

Mean of 25 observations /sample

Table 2. Incidence of coconut perianth mite in different varieties

Varieties	Number of mites per 28.28 mm²				
	March	April	May	June	Average
West Coast Tall	39.80	44.50	46.33	41.33	42.99
	(6.35)^{b}	(6.74)^{b}	(6.86)^{b}	(6.48)^{b}	(6.61)^{b}
Arasikere Tall	82.99	88.33	91.00	85.66	87.00
	(9.16)^{de}	(9.45)^{de}	(9.59)^{de}	(9.31)^{f}	(9.38)^{ef}
Laccadive	92.67	95.33	96.66	93.00	94.42
	(9.68)^{e}	(9.81)^{e}	(9.86)^{e}	(9.69)^{f}	(9.76)^{f}
Gangabondam	21.33	31.50	32.66	30.33	28.96
	(4.71)^{a}	(5.68)^{a}	(5.76)^{a}	(5.60)^{a}	(5.44)^{a}
Philippines	45.50	52.37	60.03	57.00	53.73
	(6.80)^{bc}	(7.28)^{bc}	(7.81)^{bc}	(7.61)^{c}	(7.38)^{c}
Green Dwarf	84.33	87.50	89.33	88.50	87.42
	(9.24)^{de}	(9.41)^{de}	(9.50)^{de}	(9.45)^{f}	(9.40)^{ef}
Andaman Dwarf	78.50	80.33	84.50	83.30	81.66
	(8.91)^{d}	(9.02)^{d}	(9.25)^{d}	(9.17)^{ef}	(9.09)^{de}
Laccadive Dwarf	51.08	60.53	61.73	60.00	58.34
	(7.22)^{c}	(7.84)^{c}	(7.89)^{c}	(7.80)^{cd}	(7.69)^{c}
Green Tall	84.50	88.50	87.03	85.83	86.47
	(9.25)^{de}	(9.46)^{de}	(9.38)^{de}	(9.31)^{f}	(9.35)^{ef}
Spicata	74.03	75.70	78.53	70.07	74.58
	(8.66)^{d}	(8.74)^{d}	(8.92)^{d}	(8.42)^{de}	(8.69)^{d}
S.Em.±	0.24	0.26	0.26	0.26	0.15
C.D. at 5%	0.71	0.76	0.77	0.76	0.48

Figures in parentheses are $\sqrt{x+1}$ transformed values

Means followed by similar alphabets in the vertical columns do not differ significantly by DMRT (P=0.05)

Table 3. Performance of coconut varieties on the nut damage due to Aceria guerreronis

Varieties	Number of nuts /6 bunches*/ palm				March		June		Damage grade	
	Healthy nuts		Damaged nuts		Healthy nuts %	Damaged nuts %	Healthy nuts %	Damaged nuts %		
	March	June	March	June					March	June
West Coast Tall	69.00	66.00	15.68	19.00	81.53**	18.47**	77.67**	22.33**	1.33	1.41
	(8.37)^{a}	(8.18)^{b}	(4.08)^{a}	(4.47)^{a}	(64.56)^{a}	(25.43)^{a}	(61.81)^{b}	(28.42)^{a}	(1.53)^{a}	(1.55)^{a}
Arasikere Tall	21.00	23.00	47.00	41.00	30.80	69.20	34.39	65.61	3.50	3.62
	(4.69)^{d}	(4.90)^{d}	(6.90)$^{d-f}$	(6.48)^{b}	(33.70)^{cd}	(56.30)^{cd}	(35.90)^{d}	(54.09)^{c}	(2.12)^{de}	(2.15)^{de}
Laccadive	13.00	11.00	51.00	50.00	20.25	79.74	17.97	82.03	3.64	3.70
	(3.74)^{e}	(3.46)^{e}	(7.14)^{ef}	(7.10)^{cd}	(26.73)^{d}	(63.27)^{d}	(25.06)^{e}	(64.95)^{d}	(2.14)^{e}	(2.17)^{de}
Gangabondam	73.00	78.00	17.00	16.00	59.73	40.24	83.15	16.85	1.55	1.40
	(8.59)^{a}	(8.89)^{a}	(4.24)^{a}	(4.08)^{a}	(50.95)^{ab}	(39.05)^{ab}	(65.98)^{a}	(24.29)^{a}	(1.40)^{a}	(1.54)^{a}
Philippines	35.00	31.00	29.00	38.00	54.69	45.31	44.89	55.11	2.10	2.50
	(6.00)^{b}	(5.64)^{c}	(5.48)^{b}	(6.24)^{b}	(47.68)^{b}	(42.29)^{b}	(42.09)^{c}	(47.95)^{b}	(1.76)^{b}	(1.86)^{bc}
Green Dwarf	9.00	11.00	53.00	55.00	15.22	84.77	16.62	83.38	3.81	4.00
	(3.16)^{f}	(3.46)^{e}	(7.34)^{f}	(7.48)^{e}	(23.00)^{d}	(67.07)^{d}	(24.06)^{e}	(65.94)^{d}	(2.19)^{e}	(2.24)^{e}
Andaman Dwarf	11.00	13.00	45.00	53.00	19.64	80.36	19.62	80.38	3.60	3.88
	(3.46)^{ef}	(3.73)^{e}	(6.78)$^{c-e}$	(7.34)^{de}	(26.26)^{d}	(63.69)^{d}	(26.25)^{e}	(63.75)^{d}	(2.15)^{e}	(2.21)^{e}
Laccadive Dwarf	27.00	32.00	38.00	38.00	41.51	58.49	44.88	55.12	2.40	2.20
	(5.29)^{c}	(5.65)^{c}	(6.25)^{c}	(6.22)^{b}	(40.12)^{bc}	(49.88)^{bc}	(42.07)^{c}	(47.93)^{b}	(1.94)^{bc}	(1.79)^{b}
Green Tall	13.00	10.00	47.50	50.00	21.51	78.49	16.65	83.35	3.20	3.92
	(3.73)^{e}	(3.31)^{e}	(6.93)$^{d-f}$	(7.14)^{cd}	(27.60)^{cd}	(62.65)^{d}	(24.09)^{e}	(65.97)^{d}	(2.05)^{de}	(2.22)^{e}
Spicata	20.00	23.00	43.00	44.00	31.83	68.17	34.25	65.75	2.80	2.94
	(4.58)^{d}	(4.89)^{d}	(6.63)^{cd}	(6.71)^{bc}	(31.00)^{cd}	(55.67)^{cd}	(35.80)^{d}	(54.20)^{c}	(1.95)^{cd}	(1.99)^{cd}
S.Em.±	0.15	0.15	0.18	0.21	4.21	4.22	1.12	1.78	0.06	0.06
C.D. at 5%	0.45	0.45	12.55	0.61	12.50	12.51	3.33	4.53	0.19	0.18

Figures in parentheses are $\sqrt{x+1}$ transformed values

Means followed by similar alphabets in the vertical columns do not differ significantly by DMRT (P=0.05)

* 6 bunches – 4, 5, 6, 7, 8 and 9 months old bunches

of egg population of an eriophyid mite was recorded during second fortnight of May 2005 (82.50). This indicates that there were two peaks of egg population of the mite. Relatively more number of eggs was recorded on coconut perianth during second fortnight of May (25.00). In remaining period, the egg population was in the range of 9.66 to 23.56. Relatively more number of eggs and mites were observed on nut surface compared to perianth. This might be due to fast multiplication of mite on nut surface. Yaligar (2004) also reported that mite population was peak during summer months which endorses the present findings. In the present study, damaged nuts were observed throughout the year. The percentage of damage was more than 54.62 with maximum of 85.66 while damage grading was observed between 2.30 and 3.80. Muthaih and Bhaskaran (1999) observed that most of the infested nuts were in damage grades of II and III and very few nuts were completely damaged.

With respect to screening of varieties, Gangabondam was found significantly superior over other varieties in recording less mite population (28.96) followed by West Coast Tall (42.99) where as varieties Laccadive, Green Dwarf, Arasikere Tall and Green Tall recorded more mite population (Table 2). The superiority of Gangabondam might be due to round shape nuts and tight attachment of perianth to nut surface, which might not allowed the mites to enter into the inner surface of the perianth. Gangabondam also recorded least damage grade (1.40) and **d**amaged nuts (16.00) with highest number of healthy nuts (78.00) (Table 3). Muthaih and Bhaskaran (1999) reported that Gangabondam recorded least per cent damaged nuts (12.67%) which is in accordance with the present study.

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